CLAIMS

1. Device for fractionating mixtures into their various components (A, B), of the type comprising separation elements (5) mounted in series and in a closed loop, presenting alternating points of injection (I_S, I_D, I_{A+B}) and points of drawing-off (S_E, S_R) along the series of the separation elements, in which the closed loop is formed by successive areas (I, II, III, IV) each constituted by at least one separation element (5), this device comprising at least one point of injection (I_S) of solvent (S) and one point of injection (I_D) of diluent (D) located between two respective areas, a point of injection (I_{A+B}) of mixture, at least one point of drawing-off (S_E) of extract (E) located downstream of the point of injection (I_{A+B}) of mixture, in the direction of circulation of the solvent (S), and a point of drawing-off (S_R) of raffinate located upstream of the point of injection of mixture, in the direction of circulation of the solvent (S), characterized in that:

- the solvent (S) is a supercritical pressurized fluid,

- each of the separation elements is constituted by a membrane phase separation element (5),

- it comprises means for injecting the solvent (S) at a pressure greater than its critical pressure, and for maintaining the pressure in said loop at a value above critical pressure,

- it comprises means for injecting the diluent (D) and for maintaining the pressure thereof at a

value similar to that of the solvent (S) in each of the areas (I, II, III, IV).

2. Device according to Claim 1, characterized in that the separation elements are constituted by a cylindrical envelope containing a bundle of hollow, permeable fibers (6), disposed along the longitudinal axis of the envelope and fluid inlet and outlet means, so that one of the fluids circulates inside the fibers (6) and the other outside them.

3. Device according to Claim 2, characterized in that the fibers (6) are constituted by polypropylene.

4. Device according to any one of the preceding Claims, characterized in that the respective pressures in each of the areas (I, II, III, IV) are such that the solvent power of the solvent (S) in each area is maintained constant and is different from one area to another.

5. Device according to Claim 4, characterized in that the solvent power of the solvent (S) decreases in the direction of its flow.

6. Device according to one of Claims 4 or 5, characterized in that the enthalpy is maintained constant in all the areas (I, II, III, IV).

7. Device according to one of Claims 4 to 6, characterized in that it comprises a pumping system in order to increase the pressure of the diluent (D) between each area (I, II, III, IV), in the direction of flow thereof, and a system for balancing the pressures of the diluent (D) and of the solvent (S) in each of these areas.

8. Device according to Claim 7, characterized in that volumetric pumps (P1, P2, P3, P4) are used for circulating the diluent (D) at controlled flowrates in each of the respective areas (I, II III, IV).

9. Device according to one of Claims 7 or 8, characterized in that the pressure balancing system is constituted by balancing recipients (R1, R2, R3, R4) respectively associated with each area (I, II, III, IV) and which are connected to each of the streams of diluent (D) and of solvent (S) respectively entering and leaving each downstream area, in the direction of circulation of the solvent (S).

10. Device according to Claim 9, characterized in that the interface between the diluent (D) and the solvent (S) is maintained stable by means of a system for measuring the respective levels (N1, N2, N3, N4) of the balancing recipients (R1, R2, R3, 4) acting on the flowrate regulation of the corresponding pump (P1, P2, P3, P4).